

RAINWATER HARVESTING

Rain water harvesting (RWH) is a technique of collection and storage of rainwater into natural reservoirs or tanks, or the infiltration of surface water into subsurface aquifers (before it is lost as surface runoff). One method of rainwater harvesting is rooftop harvesting. With rooftop harvesting, most any surface — tiles, metal sheets, plastics can be used to intercept the flow of rainwater and provide a household with high-quality drinking water and year-round storage.

Why rainwater harvesting is essential?

- Rain water harvesting will improve water supply, food production, and ultimately food security.
- Water insecure households or individuals in rural areas will benefit the most from rainwater harvesting systems.
- Since rainwater harvesting leads to water supply which leads to food security, this will greatly contribute to income generation.

METHODS OF RAIN WATER HARVESTING:

There are many ways in which rainwater can be harvested. Some of these methods are very effective and can aid in the collection of a lot of water even for commercial activities while others are only suitable for harvesting water meant for domestic use. Every system has its merits and demerits. These are the common methods of rainwater harvesting:

1. **Surface Water Collection Systems:** Surface water is simply water that accumulates on the ground's surface. When rainwater falls on the surface of the earth, it usually flows down slopes as it moves towards a point of depression where the moving water can collect. Surface water collection systems enable the collection of ground surface rainwater before it flows to other locations. Examples of such systems include rivers, ponds, and lls. Drainage pipes can be used to direct water into these systems. Water can then be fetched from these sources and then used for other purposes.
2. **Rooftop system:** These can also be used to harvest rainwater. They can be used to direct rainwater that falls on the roof of a building into containers or tanks. These tanks are usually elevated so that when the tap is opened, water flows at a high pressure. This method of rainwater harvesting is good because the accumulated water is mostly clean and usually requires no further treatment to make it fit for human use.
3. **Dams:** These are barriers that are designed to trap water. Rainwater can accumulate directly in them or drainage systems can be created to direct water into them. Water collected in dams is mostly used for irrigation purposes or treated and then distributed for domestic use. They can also be used to harvest a lot of water because of the way in which they are modelled. Unlike ponds, measures are put in place to reduce the amount of water draining into the ground.
4. **Underground Tanks:** These are also ideal for collecting rainwater. They are constructed by digging into the ground and creating a space which is then cemented to reduce water infiltration. The top is also sealed and water is obtained through pipes directed into the tank. To get water out, pumps are used. Underground tanks are wonderful for harvesting rainwater because the rate of evaporation is reduced since they are located underground where sunlight does not really penetrate.

5. **Rain saucer:** Sometimes one can decide to collect rainwater directly as it falls from the sky by using a rain-saucer. These look like upside down umbrellas or big funnels. Some are usually attached to a pipe so that the collected water is directed elsewhere. Some people also do a little improvisation by placing the collecting container underground with only the rain-saucer above the ground. It is a simple method yet effective.
6. **Water Collection Reservoirs:** Water collected through this method is not really clean and may be contaminated. However, it can still be used for crop irrigation. Such rainwater is harvested from roads and pavements.
7. **Barrage:** A barrage is a dam that has several openings which can be closed or opened to control the quantity of water that passes through it. It is usually large and can be used to collect a lot of water.
8. **Slopes:** Rainwater tends to collect at the bottom of slopes when it flows on the ground. When it rains heavily, water levels can rise to the hill top. This is a simple and natural way to harvest rainwater.
9. **Trenches:** This is another great way to harvest rainwater for irrigation. When it rains, the water is directed to the farm using trenches. It is one of the traditional methods of rainwater harvesting that is still very much in use today.
10. **Rain Barrels:** These are also used for rainwater harvesting. They are specifically designed for this purpose and can be purchased from retail stores. Rain barrels are used for harvesting rainwater that falls on rooftops.

ADVANTAGES OF RAIN WATER HARVESTING:

There are a lot of advantages of Rainwater harvesting such as:

1. **Water For Domestic Use:** Rainwater harvesting is beneficial because it provides a source of water for domestic use. The collected water can be used for house cleaning purposes, washing laundry and for cooking. When treated, rainwater is good for drinking. It is an easy way of obtaining water for use in the home.
2. **Water For Industrial Use:** Industries can also harvest rainwater for use in some of their processes. Rainwater meant for industrial use is normally harvested in large scale. Such companies can construct their own dams or have underground tanks to store rainwater.
3. **Supplementary Water Source:** Many areas experience water shortages during summer due to lack of rain and as a result of the high rate of evaporation. It can be difficult to get a reliable source of water during these periods. Those who sell water may also increase their prices because of the high demand and short supply. Harvesting rainwater is therefore seen as a way of preparing for the sunny days when water is scarce.
4. **Cost Effective:** Basically we harvest rainwater for free because it is naturally occurring. If we store enough water during the rainy season, we may never have to pay

for water services again because we'll have enough supply to last through the summer. This saves us money by cutting down the monthly expenditure on water bills.

5. **Reliable Flow of Harvested Water:** Even though harvesting of rainwater depends on rainfall, once stored, the supply of the available quantity is guaranteed. We can have an uninterrupted flow of water from the place of storage as long as the amount harvested has not been exhausted. The same cannot be said when we depend on an outside source to supply our water. There is also the benefit of locational-suitability because the source of water is in our place of stay.
6. **Mitigates/Reduces The Impacts of Floods:** Harvesting rainwater plays a key role in mitigating or reducing the impacts of floods. When rainwater is directed to farms through trenches or collected in dams, its movement is controlled. This prevents the accumulation of water in one area, something that often causes flooding. Rivers can also overflow and cause flooding in the adjacent areas. The negative impacts of floods are too many and costly. Harvesting rainwater is, therefore, an effective way of reducing the impacts of this natural disaster.
7. **Building and Construction:** Collected rainwater can be used for building and construction. The process of building a house requires a lot of water. Harvesting rainwater would thus avail water for this activity.
8. **Helps In Preventing Water Pollution:** Rainwater flowing on the ground surface can carry with it a lot of impurities and toxic substances. When it drains into water bodies, it pollutes them because of these impurities. Harvesting rainwater, therefore, prevents pollution of water bodies.
9. **Irrigation:** Rainwater is good for farming because once harvested, it can be used for irrigation especially during the summer. One can, therefore, have a thriving farm and realize a bumper harvest.
10. **Saves Potable Water:** Instead of using clean and treated water for other purposes such as washing and in the toilet, rainwater can be used. This saves potable water which would then be used for drinking and cooking only.

Rainwater harvesting systems can range in complexity, from systems that can be installed with minimal skills, to automated systems that require advanced setup and installation. The basic rainwater harvesting system is more of a plumbing job than a technical job, as all the outlets from the building terrace are connected through a pipe to an underground tank that stores water. Systems are ideally sized to meet the water demand throughout the dry season, since it must be big enough to support daily water consumption. Specifically, the rainfall capturing area such as a building roof must be large enough to maintain adequate flow of water. The water storage tank size should be large enough to contain the captured water.

Before a rainwater harvesting system is built, use of digital tools is useful. For instance, to detect if a region has high rainwater harvesting potential, rainwater-harvesting GIS maps can be made to estimate how much water is needed to fulfil a community's water needs.

Rainfall is a very important weather phenomenon. It is a source of water and is very critical for the growth of crops and farming. Harvesting rainwater is a practice that has been going on for a while. Many people actually engage in it without even realizing that they are doing so. Because of weather changes, water sources can dry up and in the process impact animal, human, and plant life negatively. Rainwater harvesting is a smart way of preparing for such times because even when the conventional water sources dry up, we can still use the stored water for many purposes. The best part is that this type of water is naturally occurring. Some of the setbacks can be avoided by taking precautionary measures. When we employ innovation and technology, we can come up with better ways of rainwater harvesting and increase the storage capacity.

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